IMPROVING COGNITIVE INDEPENDENCE OF DEMENTIA PATIENTS USING MACHINE LEARNING ENABLED MOBILE APPLICATION

Project Id: 2023-081

Project Proposal Report

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B.Sc. (Hons) Degree in Information Technology

Department of Computer Science and Software Engineering

March 2023

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A declaration, copyright statement, and the statement of the supervisor.

We declare that this is our work, and this proposal does not incorporate without acknowledgment any material previously submitted for a degree or diploma in any otheruniversity or institute of higher learning, and to the best of our knowledge and belief, it does not contain any material previously published or written by another person except where the acknowledgment is made in the text.

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ABSTRACT

In general, dementia is defined as a memory, thinking, or decision-making impairment that interferes with daily tasks. Researchers say, personal journal keeping can reduce the risk of dementia in all causes. Simply, a personal journal is a diary that a person keeps for the purpose of logging their everyday emotions, thoughts, and sentiments. Dementia patients can reduce the severity of the condition of the disease by maintaining a diary day by day. Diary keeping helps in storing the data and information associated with the patients' experiences as well. Here, we consider dementia patients at mild and moderate stages of the disease. The information in web results that more elderly persons are at risk when comparing the ages of the affected. As most of the patients are old, their articulacy and literacy may be poor. Therefore, the suggested solution is an innovative diary keeping technique, which is a digital audio diary where patients can record voice and keep tracks saved in their mobile inside an application. Further these voice recordings are converted into texts and saved for later observations as well. Finally, a summarized deliverables could be obtained by examining the speech and text files. Machine learning along with natural language processing mechanisms are used in so-called implementations. With the use of this solution, we hope to improve the quality of life of mild to moderate dementia patients.

Keywords – Dementia, Voice recognition, speech to text, natural language processing

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LIST OF ABBREVIATIONS

Abbreviation	Description
LPC	Linear Predictive Coding
MFCC	Mel-frequency cestrum co-efficient
HMM	Hidden Markov Model
ASR	Automatic Speech Recognition
ANN	Artificial Neural Networks
NLP	Natural Language Processing

1. INTRODUCTION

1.1 Background and Literature Survey

In this study, we looked at existing technological work associated with dementia patients. Most of them result in association with the caregivers of the patients. As we adhere the fact of independency of the patient, the suggested solutions are basically involved with only the patient. When considering the statistical records, dementia is a global issue, with someone developing the disease every three seconds worldwide. It is predicted that by 2020, the number of people living with dementia will exceed 55 million. This number is expected to reach 78 million by 2030 and a staggering 139 million by 2050. It is noteworthy that the majority of this increase will be seen in developing countries. [1] Ages affected in mild to moderate dementia can be considered as the following details. People as young as 30 can develop dementia, though this is very uncommon. The majority of younger dementia sufferers are middle-aged, between the ages of 50 and 60. People diagnosed with dementia under the age of 65 are referred to as having "young onset dementia," "early onset dementia," or "working life dementia." [2]

Results from earlier studies by Jessica J. Weyerman, Cassidy Rose, and Maria C. Norton revealed that, in the larger group, having ever written in a journal strongly predicted a 53% lower risk of dementia due to all causes. Percentage of 6+ Letter Words predicted AD and all-cause dementia risk in the subsample of transcribed works, with all logistic regression models controlling for age, education, gender, and Latter-Day Saint affiliation. [3] This was used as a proof to determine the effect of journal keeping could reduce the dementia risk.

Some researches mentioned a diary interview technique that has been used to investigate daily patterns of a dementia patient. As mentioned in the research paper, the requested diary interview method, in which a participant records his or her thoughts and feelings under the guidance of a researcher, has been used in health research since the 1930s (Burman, 1995). It has been modified to examine the lives of people with dementia. When people are asked to keep a regular journal of their experiences, rich data about individual motivations, emotions, and beliefs are collected in an unobtrusive manner over time. [4] The progress shows that

patients were able to understand the days separately and some said they enjoyed keeping the diary records as well.

Nearly all of the diarists and their partners stated in AN INDEPENDENT EVALUATION OF "DEMENTIA DIARIES" that the project gave them a role and a purpose. Making diary entries provided them something worthwhile to concentrate on and strive towards. Diarists felt valuable and valued when they knew that their entries were being read and were benefiting others. [5]

An online survey was also conducted for more data gathering and research purposes and more than 50 responses were collected.

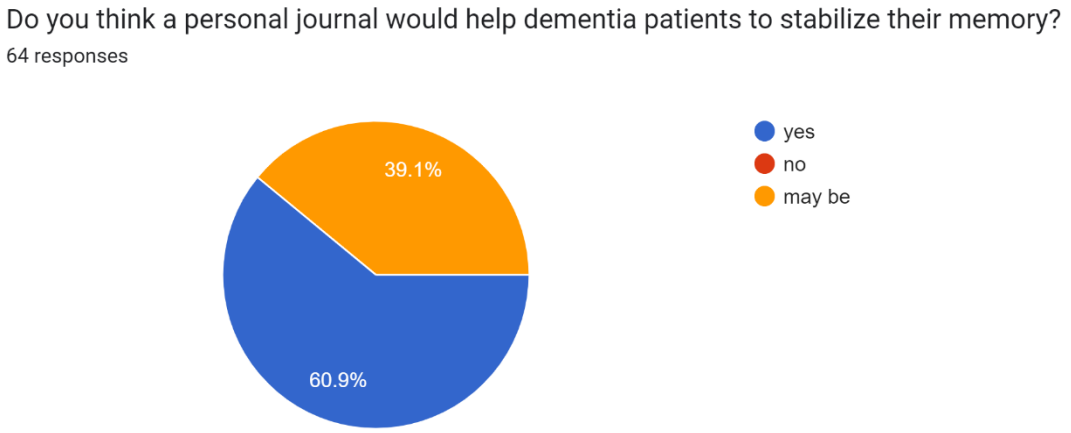

Figure 1.1. 1: Survey results on journal impact of stabilizing memory

The survey's findings suggest a link between keeping a personal journal and dementia patients' ability to stabilize their memory. When asked if keeping a personal diary helps maintain memory, the majority of respondents, 60%, said "yes," while 40% said "no." This implies that a sizable proportion of people have reported memory stabilization as a result of keeping a personal diary. Personal journals can serve as a record of everyday activities, thoughts, and feelings, which can aid memory and knowledge retention in dementia sufferers. Additionally, keeping a diary may help to lessen stress and anxiety, which can improve general cognitive function.

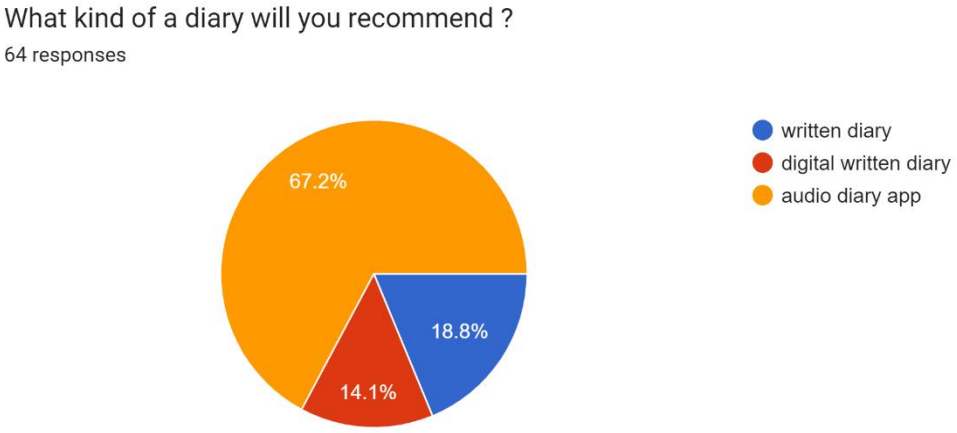

Figure 1.1. 2: Survey results on diary type

The results obtained were more favorable with proposed system and the audience responded with positive reflections. According to the study findings, 67.2% of participants would rather keep an audio diary than a written one or a digital one. Only 18.8% of respondents said they preferred a written diary, and 14.1% said they preferred a digital diary. These results imply that many people who want to keep a private journal of their thoughts and experiences select audio diary keeping as their preferred technique.

The ease with which people can naturally and spontaneously record their thoughts and feelings makes audio diaries popular, perhaps for this reason. Audio diaries can be easily and rapidly recorded using a smartphone or other recording device, in contrast to written journals, which demand time and effort to physically transcribe material. Additionally, audio diaries might be easier for people to access who struggle with reading and writing or who might have trouble using technology. It is important to keep in mind that keeping an audio journal may have some disadvantages. For instance, organizing and searching through recordings could be more challenging than written or digital written information. Additionally, audio recordings may be prone to loss or damage, which could lead to the loss of important data.

Overall, the survey's findings indicate that people who want to keep a private journal of their experiences, ideas, and feelings frequently choose to keep audio diaries. Before selecting a

strategy to use, people should take into account the potential advantages and disadvantages of various diary-keeping techniques.

1.2 Research Gap

According to the literature survey, most of the diaries are maintained to collect data and caregivers were responsible in a way during the process. But the outcome of this system is to improve the independency of the dementia patient. Therefore, patient-friendly techniques are used in the proposed system. The main benefit is that this is an audio diary. It helps the elderly patients. They can access the diary even without any help from the others. An audio diary is easy to handle than a written diary because the literacy levels are much lower among the dementia patients.

However, there are enough evidence to say that this diary keeping technique is beneficial to a dementia patient. Some related work say that patients even enjoyed diary wring as well. [5] When their life patterns are recorded in a daily basis, they get familiarized with the daily routine and this leads in improvement in their memory. Therefore, the condition of the illness can be reduced or kept not being severely affected.

When comparing the data collected and proposed deliverables, there are no existing system or a single application that includes all the functionalities given in the following table.

Table 1.2. 1: Novelty of the proposed system

	[3]	[4]	[5]	Proposed system
Including audio recordings of patients	no	yes	yes	yes
Usage of voice recognition	no	yes	yes	yes
Speech to text conversion and storage of text files	no	no	no	yes
Sentimental analysis of the generated text file and part of speech tagging	no	no	no	yes

Named entity recognition	no	no	no	yes
Speech summarization	no	no	no	yes

This research component of the proposed system includes all of the above-mentioned features. Since there are no any application with all the features the proposed system to be implemented is a novel innovative creation.

The online survey responses are shown below.

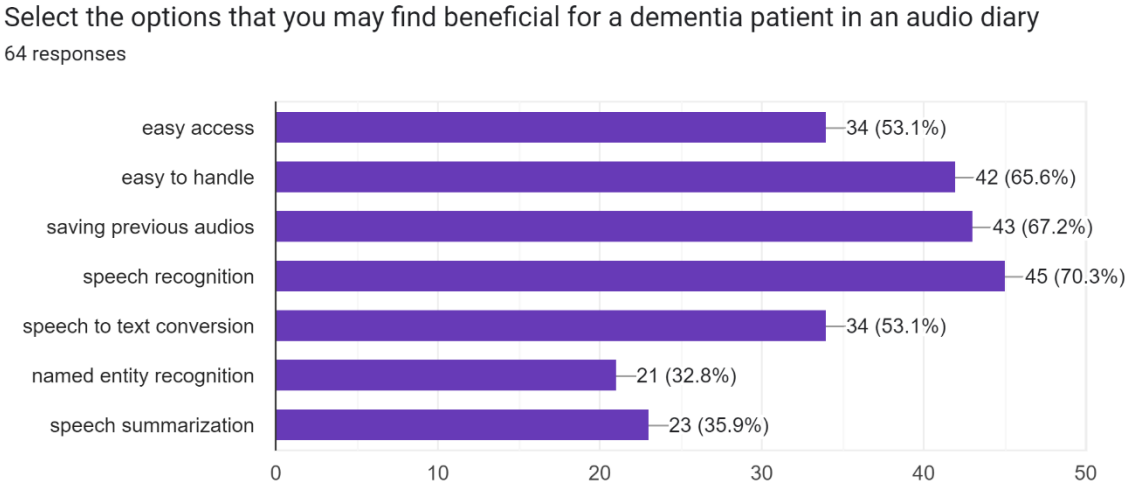

Figure 1. 1: Survey results on selecting benefits

According to the survey's findings, users greatly valued capabilities like speech recognition, speech-to-text conversion, storing older audio recordings, and simple access. This implies that those wishing to adopt audio diary keeping or other comparable technologies should take these advantages into account. For those who struggle with writing or typing, speech recognition and speech-to-text conversion can be helpful features that make it simple and quick for them to capture their ideas and experiences. These capabilities also make it convenient to record data hands-free, which may be especially helpful for people with limited mobility or who are always on the move. People may keep their recordings organized and accessible by saving older audio files and using features that make it easy to access them. Easy access features can make it

simple to record fresh material or to examine past recordings at any time, and being able to rapidly search through previous recordings can help people discover the information they're looking for.

Overall, the survey findings indicate that when it comes to audio diary keeping or other similar tools, people favor features that provide organization, accessibility, and ease. Speech recognition, speech-to-text translation, preserving previously recorded audio files, and quick access features can all contribute to making audio diary keeping a useful tool for anyone who want to keep a journal of their ideas and experiences.

1.3 Research Problem

The main significant feature of a dementia patient is the occurrence of memory impairments. Forgetting things can increase the complexity of their lives. They even have to face many challenges when living. Sometimes this can be a difficulty to their family and caretakers as well. As we focus on the patient's independency, the proposed solutions are directed towards that. We are considering the mild to moderate stages of the disease and most of the affected persons are older. Therefore, their literacy and even vocabulary is poor.

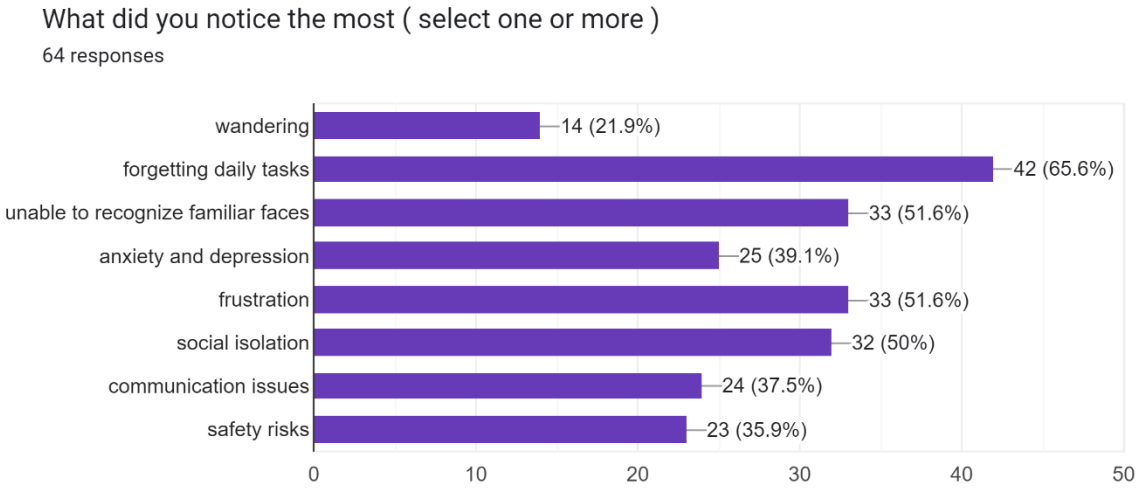

Figure 1.3. 1: Survey results on noticing dementia behaviors

The above figure shows the responses for noticing the behavioral patterns of dementia patients by the audience.

Dementia patients may forget how to perform routine activities such as dressing, grooming, and cooking, which can make them reliant on others for assistance. They can keep a note regarding such details as well. Because later this can help them remember things. Dementia patients may struggle to remember people's names and faces, which can make social interactions difficult and lead to social isolation. This isolation also can be eradicated if they keep tracking these requirements. They may forget words or struggle to form coherent sentences, making communication difficult. By keeping a diary their literacy skills and then communication skills can also be improved. Forgetting things can be frustrating and stressful for dementia patients, leading to agitation and behavioral issues. Such instances can also be avoided if they practice keeping a personal journal with them. Overall, forgetting things can have a significant impact on the daily life and well-being of dementia patients, and strategies to manage this symptom are an important part of their care plan.

The following diagram represents how the audience reacted to benefits of keeping a diary.

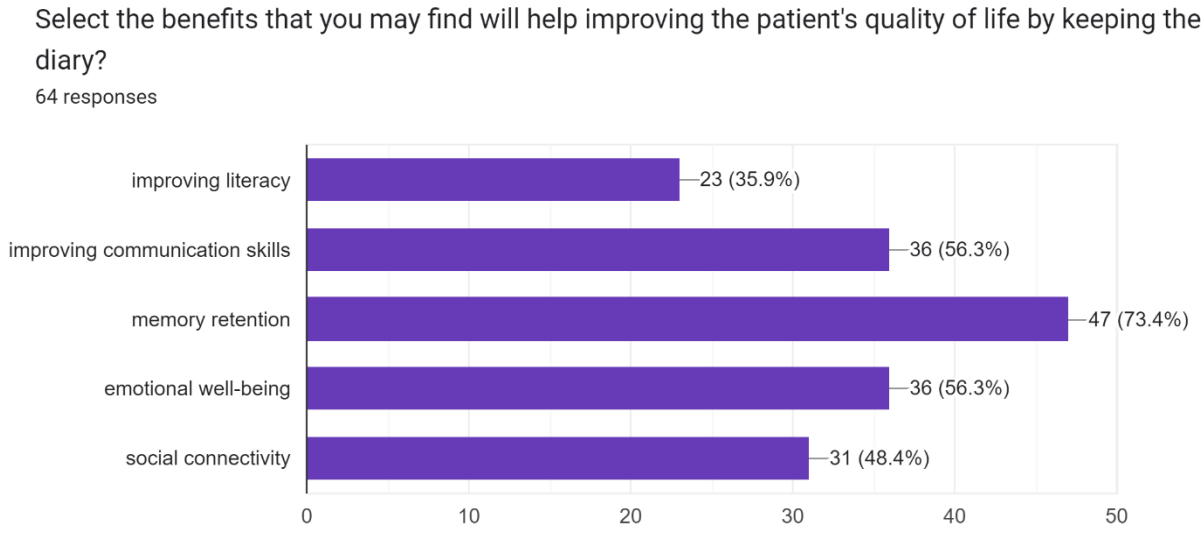

Figure 1.3. 2: Survey results on benefits for quality of life

The results of the study indicate that factors which improve memory retention, communication skills, and emotional wellbeing are highly valued by participants as being beneficial for enhancing the lives of those with dementia. These findings suggest that these elements are crucial for the overall wellbeing of individuals with dementia.

Finding techniques to enhance memory function can significantly benefit someone with dementia's quality of life because memory retention is one of their main concerns. It is possible to increase people's capacity for communication and social interaction by giving them the tools and techniques necessary to remember information and recall significant experiences. Another crucial factor in raising the quality of life for those with dementia is improving communication abilities. Communication difficulties that arise as the illness worsens might make people feel frustrated and alone. It is possible to enhance a person's capacity to connect with people and uphold social ties by giving them the tools necessary to speak more successfully, such as speech therapy or assistive technologies. Dementia sufferers must also take their emotional health into account. Anxiety, depression, and other emotional difficulties may accompany the illness and negatively affect the patient's general quality of life. It is possible to assist people in coping with these difficulties and preserving their sense of well-being by offering emotional support, such as therapy or support groups.

In general, the results of the survey demonstrate that attributes that improve memory retention, communication skills, and emotional wellbeing are considered valuable by the respondents as means to improve the quality of life of individuals with dementia. Focusing on these areas to aid individuals in preserving their cognitive abilities, communicating effectively, and maintaining emotional wellbeing can provide the assistance they require and ultimately enhance their overall quality of life.

2. RESEARCH OBJECTIVES

2.1 Main Objective

Designing a smart solution via an application to improve the quality of life and the independence of a Dementia patient is the main objective of the proposed whole system. Improving the independence and quality of life of dementia patients requires a holistic approach that addresses physical, emotional, and environmental factors. Working with healthcare professionals and caregivers can help develop an individualized plan that meets the unique needs of each patient. The proposed system basically covers most of the above-mentioned factors.

2.2 Specific Objective

Improving the cognitive independence and wellbeing of dementia patients by motivating them to maintain a digital audio diary.

User's voice detection and speech recognition

- a proper mechanism should be implemented to detect the user's voice via the mobile phone.

Converting speech to text

- user's speech should be converted into text in order to save them as text files to view them in future.

Sentiment analysis

- The text generated from speech can then be analyzed to determine the emotional tone or sentiment of the speech.

Part of speech tagging

- The next step is to identify and classify the different parts of speech in the text, such as nouns, verbs, adjectives, etc.

Named entity recognition

- Named entities such as people, organizations, and locations can be identified and extracted from the text.

Speech summarization

- It is possible to create a summary of the speech that highlights the most significant information, providing a more concise version of the original text.

3. METHODOLOGY

This research component of the project includes several natural language processing algorithms and machine learning algorithms when it comes to implementations. Speech recognition refers to a machine or program's capability to identify words and phrases in spoken language and convert them into a format that can be understood by computers. Speech recognition systems can be classified based on three criteria, which are speaker, voice sound, and vocabulary. [6] A basic speech recognition model follows the standard steps in the following figure.

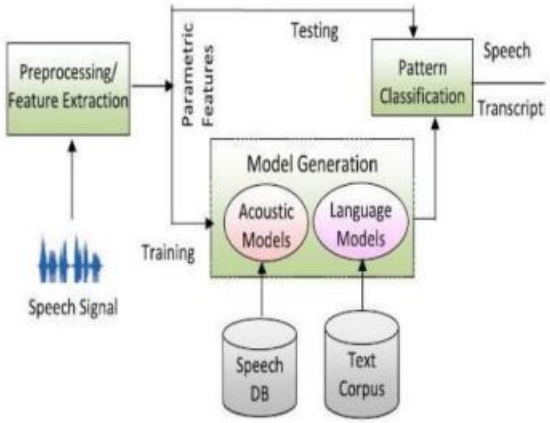

Figure 3. 1 : Structure of a basic speech recognition model

Pre-processing and feature extraction models are commonly implemented using Linear Predictive Coding (LPC), Mel-Frequency Cestrum Co-efficient (MFCC) Dynamic Time Warping techniques. Pattern classification can also be done using several approaches. Knowledge Based Approach, Neural Network Based Approach, Statistical Based Approach are some classification techniques.

The process of translating spoken words into written texts is known as speech to text conversion. It is the same as speech recognition, however the latter term is used to refer to the broader speech comprehension process. The ideas and procedures for speech recognition are followed by STT, although each phase uses a different combination of approaches. Due to the fact that a speech signal can be seen as either a piecewise stationary signal or a short-term stationary signal, the Hidden Markov Model (HMM) is a statistical model used in speech

detection. HMM models are helpful for mobile users' real-time audio to text conversion. ASR with Cuckoo Search Optimization approach is used in Artificial Neural Network Classier (ANN) based Cuckoo Search Optimization for improved communication, better identification, and to remove undesirable noise.

A hybrid solution would help applications that need a concise summary of long talks, which is very helpful for documentation, as the proposed component combines speech to text conversion and text summarizing. The proposed approach's design flow is illustrated in the Figure provided, depicting two separate modules for speech recognition and text summarization.

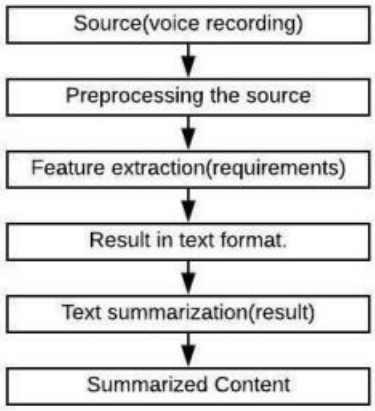

Figure 3. 2: Structure of a hybrid model

Any application that calls for summarization benefits from the combination of these two modules. To deal with NLP (Natural Language Processing), you must first and foremost extract the features from the speech that have some values. When a word or sentence is identified as meaningless, it becomes difficult to summarize it. Because semantics are crucial when summarizing the text, even the punctuation is crucial. [7]

3.1 Software Solution

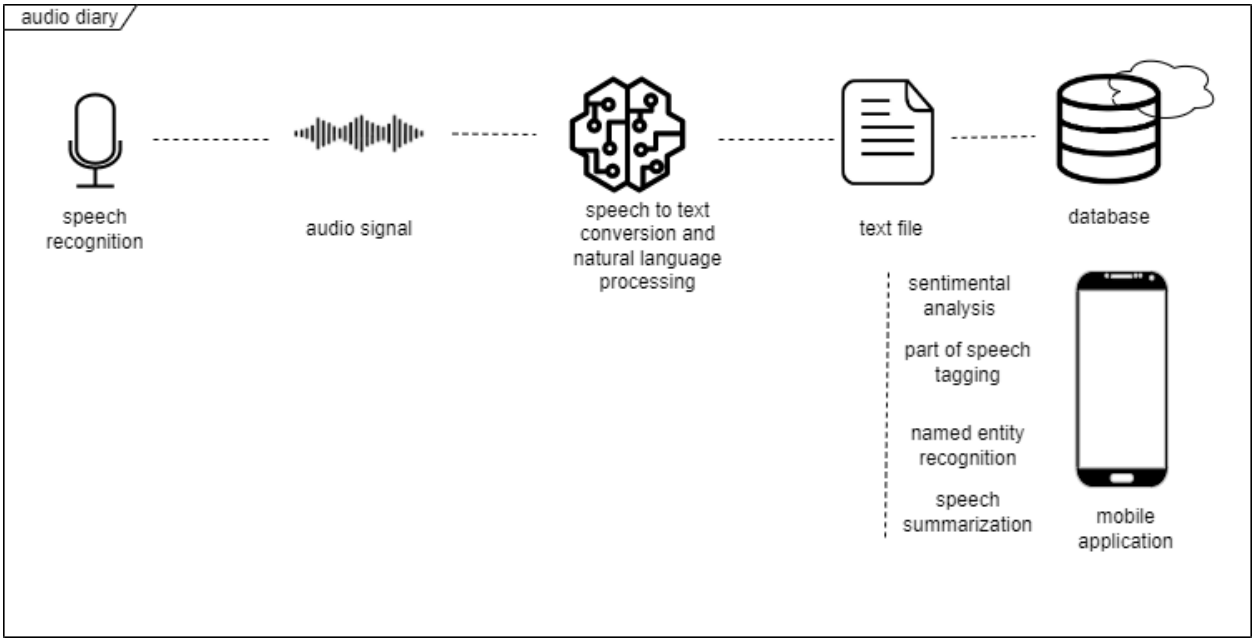

Figure 3.1. 1: System Overview diagram

3.2 The Flow of Project

3.2.1 Requirement Gathering and Analysis

The initial step of requirements gathering was started after a meeting with the other members of the project and the supervisors. Following the advices received by them, we started collecting relevant data and information. A survey was conducted among the people in order to check the knowledge and basic surroundings. It was randomly distributed via social media platforms and a considerable number of responses were collected. The questions included were based on the existing diaries and the proposed system. Along with that many relevant research papers were read and gathered information about existing systems. The novelty of the proposed system was discussed by examining the existing applications. Many new features are subjected to be implemented focusing on the novelty of the project.

3.2.2. Feasibility Study

The following aspects of the feasibility study were focused in order to get successful outcomes.

Scheduled feasibility – a gantt chart was created to produce the outcomes in the expected timelines. Each phase of the project can be completed at given time periods. So that the complexity of the project can be reduced.

Technical feasibility – as discussed in the methodology section, there should be a knowledge on development tools and technologies in order to produce the expected outcome. Natural language processing and machine learning algorithms should be used under the proper guidance.

Economic feasibility – the cost of the project should be maintained under less expenses and comprehensiveness should be more.

3.2.3. Implementation

The proposed system will be implemented including all the four research components of the members. The machine learning models will be created with necessary data sets and proper algorithms will be used. The interconnection of components will be integrated by considering the similar software architectural patterns.

3.2.4. Testing

Testing of the system will be done in each testing level during the component implementations. Then the whole system will be tested according to the proper testing mechanisms. If there are any issues during the testing phase, these should be addressed before the product is released.

3.3 Project Requirements

3.3.1. Functional Requirements

- The system should be able to convert speech to text in real time. Therefore, speed of conversion is considerable.
- The system must be compatible with the language support and vocabulary support.
- The system must be implemented considering the context awareness.
- The system must be compatible with the integration.
- The system should generate the speech summary analyzing the text generated.

3.3.2. Non-functional Requirements

- Performance - the application needs to be optimized for mobile platforms that dementia patients frequently use. This entails making sure the application is snappy, launches quickly, and uses minimal data or energy.
- Scalability - The application should be able to handle increased traffic and usage when more dementia sufferers start using it without slowing down or crashing. This could entail making the application responsive on various mobile device types and making sure the backend infrastructure can support the added demand.
- Security - The program should be created with straightforward and efficient security features because dementia sufferers may have trouble understanding or remembering sophisticated security procedures. This may involve taking steps like data encryption, auto-logouts, and biometric authentication.
- Reliability - The application should be made to function consistently and dependably, even in challenging circumstances. This might include attributes like offline functionality, error handling, and automatic data backups.
- Maintainability - Even when new features are added or the application is modified for new mobile device kinds, the application should be simple to maintain and update. This could

involve using modular components, comprehensive documentation, and well-structured code in the design of the application.

3.3.3. User Requirements

- This mobile application must be installed to the user's smart phone.
- User should have basic knowledge in English language.
- User should have an understanding about how to use a simple mobile application.

3.4 Commercialization

To guarantee its efficacy and safety, the commercialization of a mobile app for dementia patients entails numerous regulatory considerations. Clinical trials and regulatory body permissions might be required for the app. Moreover, funding for the creation and promotion of the app could come from sponsorship from governmental organizations, academic institutions, or pharmaceutical firms. To expand the number of prospective users of the app and promote early diagnosis and treatment, it is also crucial to raise awareness of dementia among the public. Relationships with advocacy groups, professional associations, and healthcare organizations could assist spread information and connect with target audiences. Therefore, the development of a mobile app for dementia patients necessitates a thorough strategy that takes into account legal, financial, and public health considerations.

4. BUDGET AND JUSTIFICATION

Table 4. 1: Budget for the proposed system

Item	Estimated Cost (LKR)
Device Creation	15,000
Hosting	10,000
App publishing cost on the Google Play store	5,000
Internet & Utility Costs	10,000
Total estimated cost	40,000

REFERENCES

[1] [Online]. Available: https://www.alzint.org/about/dementia-facts-figures/dementia-statistics/.

[2] [Online]. Available: https://www.scie.org.uk/dementia/symptoms/young-onset/key-issues.asp.

[3] Jessica J. Weyerman, Cassidy Rose, Maria C. Norton, "Personal Journal Keeping and Linguistic Complexity Predict Late-Life Dementia Risk: The Cache County Journal," 2016.

[4] R. Bartlett, "Modifying the Diary Interview Method to Research the Lives of People With Dementia," 2012.

[5] Woodall J., Surr C., Kinsella K., Bunyan A., "An independent evaluation of 'Dementia Diaries'," 2016.

[6] Ayushi Trivedi,Navya Pant, Pinal Shah,Simran Sonik and Supriya Agrawal , "Speech to text and text to speech recognition systems-Areview".

[7] Vinnarasu A., Deepa V. Jose, "Speech to text conversion and summarization for effective understanding and documentation".

5. APPENDICES

5.1 Gantt Chart

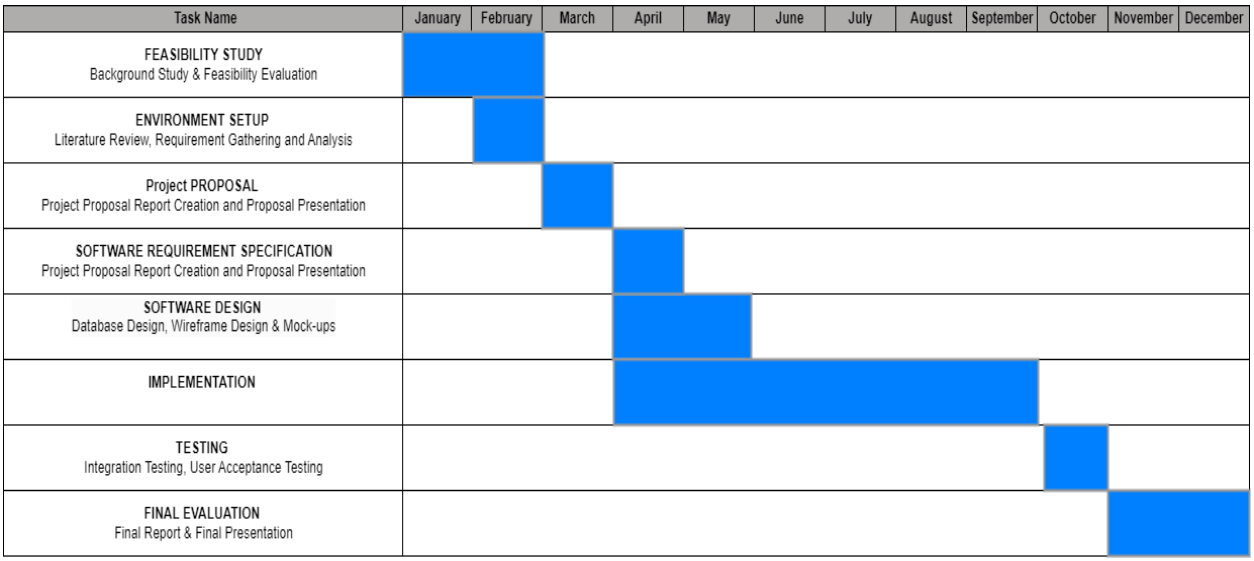

Figure 5. 1: Gantt Chart

5.2 Work Breakdown Structure (WBS)

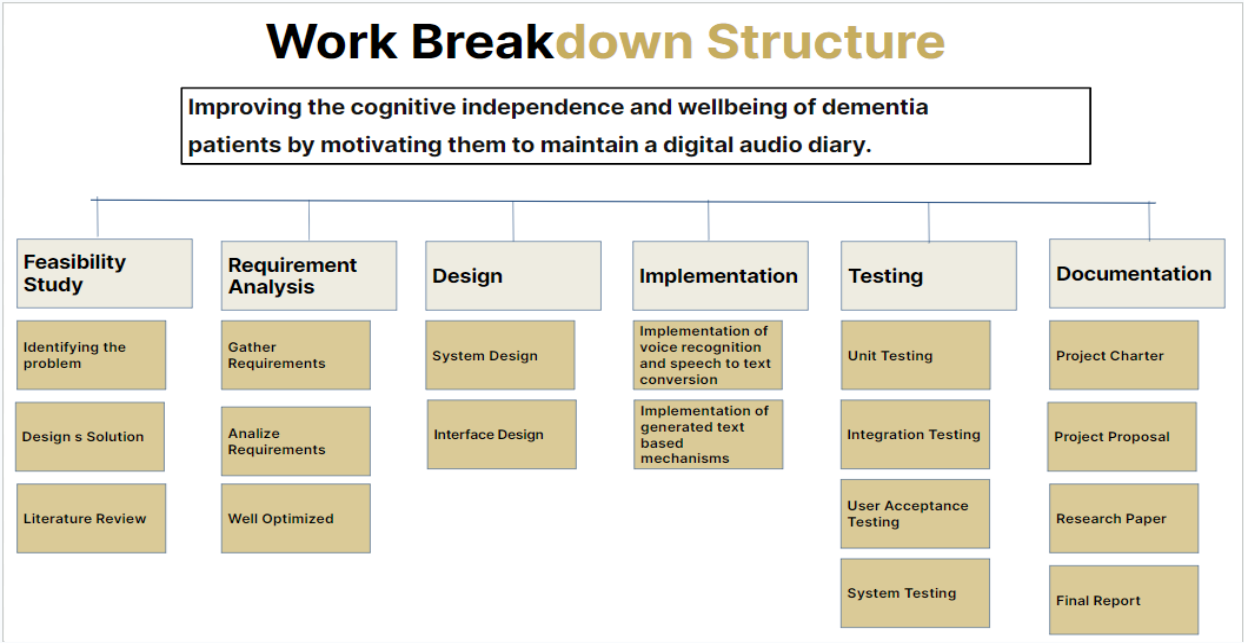

Figure 5. 2: Work Breakdown Structure (WBS)

5.3 Online Survey

Survey on Dementia and experimental research

Dear Respondent,
I'm a Final year student from the department of computer science and software engineering, faculty of computing , SLIIT

I'm researching about dementia patients and their caretakers to identify patients' experiences in day to day life. This survey is conducted to gather some data required to proceed with the research.

shainiuj@gmail.com (not shared) Switch account

* Required

Have you ever heard of dementia *

- yes
- no

Have you ever seen their behavioral patterns (even from a documentary or a movie / tv series) *

- yes
- no

What did you notice the most (select one or more) *

- [ ] wandering
- [ ] forgetting daily tasks
- [ ] unable to recognize familiar faces
- [ ] anxiety and depression
- [ ] frustration
- [ ] social isolation
- [ ] communication issues
- [ ] safety risks

Do you know any person who is affected with dementia? *

- ( ) yes
- ( ) no

If yes, what is the relationship with the patient?

- ( ) family member
- ( ) friend

- ◯ neighbor
- ◯ other

That patient's age

- ◯ 1-20
- ◯ 20-30
- ◯ 30-40
- ◯ 40-50
- ◯ 50-60
- ◯ 60-80
- ◯ 80-100

Patient's gender

- ◯ male
- ◯ female

Do you keep a personal journal as a habit? *

- ◯ yes
- ◯ no

Do you think a personal journal would help dementia patients to stabilize their memory? *

- ◯ yes
- ◯ no
- ◯ may be

What kind of a diary will you recommend ? *

- ◯ written diary
- ◯ digital written diary
- ◯ audio diary app

Select the options that you may find beneficial for a dementia patient in an audio diary *

- [ ] easy access
- [ ] easy to handle
- [ ] saving previous audios
- [ ] speech recognition
- [ ] speech to text conversion
- [ ] named entity recognition
- [ ] speech summarization

What other features do you think that should be included in the app ?

Your answer

Select the benefits that you may find will help improving the patient's quality of life by keeping the diary? *

- [ ] improving literacy
- [ ] improving communication skills
- [ ] memory retention

- [ ] social connectivity

Have you ever heard of audio diaries implemented specifically for dementia patients? *

- ( ) yes
- ( ) no

Have you ever interacted with an audio diary application ? *

- ( ) yes
- ( ) no

Do you think those existing features in that app could help dementia patients too? *

- ( ) Yes
- ( ) No
- ( ) Maybe

Submit Clear form

5.4 Plagiarism Report

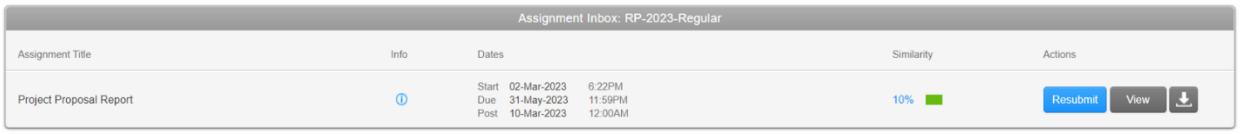

Figure 5. 3: Plagiarism Report